

PATTERNEDE STRAINED SEMICONDUCTOR SUBSTRATE AND DEVICE

Abstract

A method that includes forming a pattern of strained material and relaxed material on a substrate; forming a strained device in the strained material; and forming a non-strained device in the relaxed material is disclosed. In one embodiment, the strained material is silicon (Si) in either a tensile or compressive state, and the relaxed material is Si in a normal state. A buffer layer of silicon germanium (SiGe), silicon carbon (SiC), or similar material is formed on the substrate and has a lattice constant/structure mismatch with the substrate. A relaxed layer of SiGe, SiC, or similar material is formed on the buffer layer and places the strained material in the tensile or compressive state. In another embodiment, carbon-doped silicon or germanium-doped silicon is used to form the strained material. The structure includes a multi-layered substrate having strained and non-strained materials patterned thereon.